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noise element

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IMPERIAL COUNTY GENERAL PLAN NOISE ELEMENT

I. INTRODUCTION

A. Preface

The Noise Element of the General Plan is a mandatory component of all general plans pursuant to the State Government Code, Section 65302. The State guidelines, Section 65302(f), specify the content of the Noise Element, which includes the requirement to analyze, to the extent practicable, the current and projected noise levels of:

- Highways and freeways;
- Primary arterials and major local streets;
- Passenger and freight on-line railroad operations and ground rapid transit systems;
- Commercial, general aviation, heliport, helistop, and military airport operations, aircraft overflights, jet engine test stands, and all other ground facilities and maintenance functions related to airport operation;
- Local industrial plants, including, but not limited to railroad classification yards; and
- Other ground stationary noise sources identified by local agencies as contributing to the community noise environment.

The Noise Element must delineate noise contours for the above noise sources, which shall be used as a guide for establishing a pattern of land uses in the land use element that minimizes the exposure of community residents to excessive noise. The Noise Element must identify and appraise noise problems in the planning area and provide policy programs to avoid potential noise problems. Policies established in the Noise Element is applicable to lands that are owned or zoned by the County; lands regulated by the State or Federal government are preempted from local land use policy.

B. Purpose of the Noise Element

Noise is generally defined as unwanted sound. Exposure to noise can result in interference with speech, distractions at home and at work, disturbance of rest and sleep, and the disruption of various recreational pursuits. Long-term exposure to high noise levels can affect psychological and physiological health. The Noise Element of the Imperial County General Plan provides a program for incorporating noise issues into the land use planning process, with a goal of minimizing adverse noise impacts to receptors which are sensitive to noise.

THEORY OF THE EARTH

INTRODUCTION

1.1

The theory of the earth is a branch of geology which deals with the origin and development of the earth and its various parts. It is a science which seeks to explain the processes which have shaped the earth and its features.

1.2

1.3

1.4

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The Noise Element identifies existing and future noise sources, and defines noise-sensitive land uses. The element establishes goals, objectives and procedures to protect the public from noise intrusion. Implementation of these guidelines and procedures will promote the development of noise sensitive land uses outside of noise impact zones, and discourage the development of noise generating activities near noise-sensitive land uses.

The description of noise requires the use of terms which may not be familiar to most readers of this General Plan. Terms are described briefly in the text. Appendix A is a glossary of terms to assist the reader of the Noise Element.

C. Noise Measurement

Noise is a form of energy. A standard unit of measure of the noise level, or sound pressure level, is the decibel (dB). Sound is also described by frequency, or pitch, and comprehensive measurements describe the sound level for each specified frequency range. For the assessment of noise levels to a human receptor, the frequency range measurements are combined into a single value, the "A-weighted" decibel, often written dB(A) or dBA. A-weighting gives values to the individual frequencies which correspond to the human hearing spectrum. In this noise element, the use of the term dB means the A-weighted decibel. Table 1 provides examples of various sound levels.

Noise is measured with a sound level meter. This instrument includes a microphone, amplifiers, frequency weighting circuitry, readout and, usually, a means for recording and averaging data. Sound level meters should meet the specifications of the American National Standards Institute, ANSI S1-4, 1983 or later, for Type I or Type II instruments.

Average Noise Levels. The most commonly used short-term average is L_{eq} , the equivalent noise level.

When L_{eq} is used, a time for averaging may be stated, such as 15 minutes, 1 hour, 8 hours or 24 hours. If no time is stated, a one hour average is assumed. L_{eq} is usually used in the description of noise near a point source or group of sources, such as a tractor or a construction site. Policies and ordinances which regulate noise at the source are usually stated in terms of L_{eq} .

Community Noise Levels. Community noise is a term used to describe the outdoor noise environment in the vicinity of inhabited areas. Community noise is generally a combination of noise from varied and widespread sources, such as highways and railroads. Community noise usually varies in time, with the cyclic pace of noise-making activities. Therefore, an averaging of the noise level over a period of time is necessary to describe community noise levels. Further, the sensitivity to noise in the community varies during the day. People are less sensitive to noise when they are engaged in activities which in themselves make noise, such as recreation, than when they are engaged in quiet activities, such as sleeping.

The long term averages used for the assessment of community noise are the Community Noise Equivalent Level, CNEL, and the Day-Night Level, L_{dn} or DNL. These averages weight the noise levels over a 24-hour period to account for increased human sensitivity during the evening and night

The first of these is the fact that the system is not a simple one. It is a complex system, and the complexity is not only in the number of components, but also in the way they are interconnected. The second is the fact that the system is not a static one. It is a dynamic system, and the dynamics are not only in the way the components interact, but also in the way the system evolves over time. The third is the fact that the system is not a linear one. It is a non-linear system, and the non-linearity is not only in the way the components interact, but also in the way the system evolves over time.

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TABLE 1
TYPICAL SOUND LEVELS

Sound Level (dB)	Community/Outdoor	Industry/Home Indoor	Impression/Effect
130			
	Jet takeoff (200')		Threshold of Pain (130-140 dB)
120			
110	Chainsaw (2')	Discotheque	
100	Pile driver (50')		
90	Power mower Heavy truck (50')	Boiler room	Hearing damage (8 hour exposure)
80	Concrete mixer (50')	Garbage disposal	Loud/annoying
70	Freeway (100')	Noisy restaurant	Shouting required at 3 feet
60	Air conditioner unit	Department store	Loud speech required at 3 feet
50	Light auto traffic (100')	Quiet office	Normal speech at 3 feet Disturbs sleep
40	Bird calls	Library	Quite
	Soft whisper (6')		
30		Quiet bedroom	
20	North rim of Grand Canyon	Recording studio	
10			Threshold of hearing

time periods. The difference between CNEL and L_{dn} is that CNEL considers the 24-hour day divided into three periods, while L_{dn} uses two periods. The two measurements are very close, and are generally accepted as equivalent in community noise studies. L_{dn} is the measure used by the U.S. Environmental Protection Agency (EPA) for a community noise descriptor, while CNEL is commonly used in California. The Imperial County General Plan Noise Element uses CNEL.

II. EXISTING CONDITIONS AND TRENDS

A. Preface

Many activities which create objectionable noise levels in Imperial County, such as industrial operations and rail switching yards, are located within cities which are not a part of the County General. The highest traffic volumes, which are major noise sources, are within the cities of El Centro and Calexico. This section addresses only noise sources which affect unincorporated areas of the County. Information for this analysis was compiled from documents and reports on file at the County Planning Department.

B. Noise Sources

The principal noise sources in Imperial County are the transportation sources, aircraft, rail lines, and motor vehicle; the industrial sources, which include rail switching yards, utilities, and manufacturing facilities; and agricultural operations. In rural areas of the County, mining and off-road vehicle activity also create significant noise, but generally in areas without noise sensitive receptors.

1. Transportation Sources

a. Aircraft Noise

Aircraft noise which may affect sensitive land uses occurs in the vicinity of seven airports in the County: Imperial County, Brawley Municipal, Calexico International, Calipatria Municipal, Holtville, Salton Sea, and the Naval Air Facility (NAF) El Centro which is located north of the townsite of Seeley. The locations of these airports are shown in Figure 1. The noise levels and associated areas of noise impact are quantified in noise contour maps which usually are products of FAA-mandated noise surveys or Airport Land Use Plans. Appendix B contains the most recent existing noise contour maps for Brawley Municipal Airport and NAF El Centro airports.

Future airport noise levels for Brawley Municipal, Calexico International, Calipatria Municipal, and Imperial County airports, and NAF El Centro are shown on contour maps in Appendix B.

These maps are taken from the *Airport Land Use Compatibility Plan, Imperial County Airports* (ALUCP 1991). The Airport Land Use Compatibility Plan indicates that future noise contours for the Holtville and Salton Sea airports have not been determined. At the present time, Holtville Airport has no facilities other than its large runway, and its use is limited to irregular operations from military facilities at El Centro and Yuma. The future use of the airport is uncertain (ALUCP 1991). Current airport activity at Salton Sea Airport is negligible. An expansion plan for the airport exists; implementation in the foreseeable future is unlikely (ALUCP 1991).

Aircraft noises occur as part of agricultural operations, where aircraft are used for crop spraying operations.

b. Railroad Noise

The Southern Pacific Railway is the primary source of railroad transportation noise in the County. The main line right-of-way runs from the Riverside County border, just east of the Salton Sea, southeast to Niland. From Niland, the main line continues southeast to Yuma, Arizona; a branch runs south to Calipatria, Brawley, Imperial, El Centro and Calexico. A branch on this line runs east from El Centro along Evan Hewes Highway to Holtville. This branch is used primarily for agricultural transport, such as sugar beets from fields west of Holtville. The railroad lines are shown in Figure 1.

Two other railways, which are located west of Seeley, are the U.S. Gypsum rail line to their mining site in the Fish Creek Mountains; and the San Diego and Eastern Railroad (S.D. & A.E.) from San Diego through the Jacumba Mountains. The U.S. Gypsum line passes through uninhabited areas, including a military bombing range and does not impact sensitive receivers.

The S.D. & A.E. line has been non-operational east of Jacumba to Plaster City following Tropical Storm Kathleen in 1976 which destroyed tracks and bridges along much of its route.

Railroad noise on the Southern Pacific line, just north of the Riverside County border, was studied in 1990. A combination of measurements, operations data (from 1988) and modeling resulted in the data shown in Table 2. Operations data in 1992, for the main Southern Pacific line, are similar to that of 1988 (i.e., an average of about 40 trains per day), and Table 2 would apply to existing conditions. Railroad noise from the spur tracks would be much less. The branch to Imperial and Calexico averages four trains per day. The branch to Holtville averages four trains per week.

TABLE 2
EXISTING RAILROAD NOISE LEVELS

Distance (ft)	100	200	300	400	500	700	1,000	2,000	5,000
CNEL (dBA)	74	70	67	64	62	60	57	51	44

Two proposed projects could add spurs to the existing railway network. A proposed new international border crossing and bi-national industrial area east of Calexico could include a rail branchline and/or drill tracks and/or spurs. The route of the rail line could be east-west from Calexico or north-south from Holtville, dependent on availability of right-of-way and accompanying land use, environmental and economic considerations. A second proposed project is the Mesquite Landfill, which would require a spur near Glamis, running northwesterly for a distance of four to five miles. This spur would dead-end at the landfill, and be used exclusively for the transportation of solid waste.

c. Roadway Noise

Motor vehicle noise level information is obtained from measurements using a sound level meter, and is calculated using highway traffic volume, speed, and vehicle mix information. Figure 1 shows the location of existing principal roadways within Imperial County. The major east-west roadway in the county is Interstate 8 (I-8), which runs from Yuma, Arizona to San Diego County, through the city of El Centro.

State Route (SR) 98 parallels I-8 on the south to serve the city of Calexico and the community of Ocotillo. SR 78 parallels I-8 to the north, and serves the cities of Westmorland and Brawley, and continues northeast to the community of Palo Verde. The Evan Hewes Highway is Old Highway 80 which parallels I-8 on the north from Ocotillo to Seeley, El Centro, and Holtville, then back southeast to again join I-8.

SR 86 and SR 111 are the main north-south roadways. SR 86 runs from SR 111 north of Calexico, through Heber and the cities of El Centro, Imperial, Brawley and Westmorland and northward to eventually connect with Interstate 10 at Indio. It is a principal farm-to-market route for Imperial County agricultural products, and carries a high percentage of heavy trucks. SR 86 also carries heavy recreational traffic on weekends. SR 111 is located east of El Centro from Calexico to the cities of Brawley and Calipatria; and continues north along the east side of the Salton Sea past Niland and Bombay Beach to also connect with I-10 at Indio.

Other state roads include SR 115, which runs northwest from I-8 to Holtville, then north to Brawley and Calipatria; and SR 186, a short spur running south from the eastern end of I-8 to the international border.

Table 3 lists the interstate and state highways in Imperial County, and shows the vehicle volumes, mixes, and calculated noise levels. Traffic volumes are from the Circulation/Scenic Highway Element; vehicle mixes are from Caltrans 1990 data. Due to the relative low volumes on most of the roadways in the unincorporated area of the County, noise contours would not be distinguishable at a scale which could be included with this Noise Element. A large scale map (1"=2 miles) with noise contours has been provided and is on file at the County Planning Department. More detailed descriptions of the state highways and local roadways may be found in the Circulation/Scenic Highway Element of the General Plan.

A new state highway is planned for south central Imperial County. SR 7 will provide a north-south connection from SR98 to a planned border crossing and bi-national industrial area east of Calexico. SR 7 may continue north to connect with I-8. Improvements are planned to SR 86 which is expected to follow a more westerly alignment from south of Salton City to reconnect with existing SR 86 southwest of Brawley. Improvements to, and addition of non-State roads to the Imperial County roadway system are described in the Circulation Element.

TABLE 3
IMPERIAL COUNTY INTERSTATE AND STATE HIGHWAY TRAFFIC AND NOISE DATA
(EXISTING CONDITIONS)

Road Segment	Traffic					Noise			
	Volume (thousands)	Speed (mph)	Vehicle Mix (percent)			Reference CNEL dB	Distance to dB		
			Auto	Med	Heavy		70 feet	65 feet	60 feet
I-8									
w/o Ocotillo	10.7	65	84	4.8	11.2	76	180	565	1605
e/o Ocotillo	8.6	65	84	4.8	11.2	75	145	455	1355
w/o El Centro	10.9	65	87	4.0	9.0	75	170	525	1455
e/o El Centro	22.9	65	89	3.4	7.6	78	325	1005	2205
e/o 111	8.4	65	83	5.0	12.0	75	145	455	1355
w/o 115	6.5	65	81	4.8	14.2	74	125	380	1155
e/o 115	7.2	65	77	4.6	18.4	75	160	495	1405
e/o 98	8.7	65	80	4.4	15.6	75	170	530	1505
w/o 186	10.7	65	80	4.4	15.6	76	215	655	1705
e/o 186	14.0	65	80	4.4	15.6	77	275	855	2005
SR-78									
w/o 86	0.6	55	66	6.1	27.9	64	*	*	135
e/o 111S	3.5	55	70	2.1	27.9	72	80	240	775
e/o 115S	1.5	55	73	7.0	20.0	67	*	85	275
SR-86									
w/o 111	4.3	55	93	4.8	2.2	68	*	105	315
s/o 8	9.2	55	94	4.1	1.9	71	70	205	630
s/o 78E	13.5	55	90	4.8	5.2	74	130	385	1180
nw/o Brawley	5.3	55	78	6.8	15.2	72	85	245	780
s/o 78W	4.6	55	52	5.1	42.9	75	150	465	1380
n/o 78W	4.1	55	52	5.0	43.0	74	135	410	1225
SR-98									
e/o Ocotillo	1.8	55	89	4.6	6.4	65	*	55	175

TABLE 3
IMPERIAL COUNTY INTERSTATE AND STATE HIGHWAY TRAFFIC AND NOISE DATA
(EXISTING CONDITIONS)

Road Segment	Traffic					Noise			
	Volume (thousands)	Speed (mph)	Vehicle Mix (percent)			Reference CNEL dB	Distance to dB		
			Auto	Med	Heavy		70 feet	65 feet	60 feet
w/o Drew	2.1	55	89	2.6	8.4	66	*	70	220
w/o 111	12.0	55	93	2.8	4.2	73	95	300	950
w/o 8	0.9	55	77	2.3	20.7	65	*	50	160
SR-111									
s/o 86W	25.0	55	92	4.4	3.6	76	205	635	1655
s/o 8	22.0	55	93	3.7	3.3	75	170	535	1505
n/o 8	9.5	55	87	5.9	7.1	73	100	310	980
s/o 78	6.9	55	84	7.2	8.8	72	80	240	775
n/o 78	7.1	55	82	7.5	10.5	73	90	285	900
s/o 115	7.1	55	79	7.5	13.5	73	100	210	980
n/o 115	5.6	55	82	7.5	10.5	72	70	225	700
s/o Riv. Cty.	3.5	55	71	12.2	16.8	71	60	190	600
SR-115									
n/o 8	2.1	55	63	9.3	27.7	70	49	155	485
s/o 78	2.7	55	68	7.9	24.1	70	55	175	560
n/o 78	1.3	55	18	19.7	62.3	71	60	185	590
SR-186	2.0	55	90	8.8	1.2	65	*	50	150

*** indicates contour lies within the right-of-way

All calculations assume flat hard terrain with no obstructions; actual conditions

Table 4 shows the projected future noise for Interstate 8 and the state highways in Imperial County. The future volumes are from the Circulation/Scenic Highway Element; vehicle mix parameters are the same as those used for existing conditions. Roadway noise may increase 3 dB CNEL for many sections, and up to 6 dB CNEL for a few sections. Table 4 indicates that the 60 dB CNEL contour may move considerably farther from existing roadways than at present, thus exposing existing and potential sensitive receptors to greater noise levels.

TABLE 4
IMPERIAL COUNTY INTERSTATE AND STATE HIGHWAY TRAFFIC AND NOISE DATA
(FUTURE/YEAR 2015 CONDITIONS)

Road Segment	Traffic Volume (thousands)	Reference CNEL dB	Noise			Increases	
			Distance to dB			CNEL dB	Distance to 60 CNEL feet
			70 feet	65 feet	60 feet		
I-8							
w/o Ocotillo	26.1	79	440	1300	2600	3	995
e/o Ocotillo	18.3	78	310	970	2150	3	795
w/o El Centro	29.2	79	445	1310	2625	4	1170
e/o El Centro	50.4	81	705	1790	3230	3	1025
e/o 111	15.9	77	280	870	2020	2	665
w/o 115	12.7	77	240	755	1850	3	695
e/o 115	14.1	78	305	960	2120	3	715
e/o 98	13.9	77	275	865	2010	2	505
w/o 186	21.5	79	425	1255	2560	3	855
e/o 186	37.5	82	735	1840	3290	5	1285
SR-78							
w/o 86	1.6	69	*	114	362	5	227
e/o 111S	6.0	74	130	412	1230	2	455
e/o 115S	3.0	70	55	172	545	3	270
SR-86							
w/o 111	6.0	69	44	137	435	1	120
s/o 8	26.9	76	186	590	1600	5	970
s/o 78E	20.0	76	180	570	1560	2	380
nw/o Brawley	7.7	74	118	372	1145	2	365
s/o 78W	17.6	80	550	1520	2905	5	1525
n/o 78W	9.9	78	310	975	2160	3	755
SR-98							
e/o Ocotillo	6.1	71	59	187	590	6	415
w/o Drew	7.1	72	74	234	740	6	520
w/o 111	26.1	76	209	660	1710	3	760
w/o 8	1.1	66	*	61	193	1	33
SR-111							
s/o 86W	43.0	78	349	1075	2305	2	650

TABLE 4
IMPERIAL COUNTY INTERSTATE AND STATE HIGHWAY TRAFFIC AND NOISE DATA
(FUTURE/YEAR 2015 CONDITIONS)

Road Segment	Traffic Volume (thousands)	Reference CNEL dB	Noise			Increases	
			Distance to dB			CNEL dB	Distance to 60 CNEL feet
			70 feet	65 feet	60 feet		
s/o 8	37.8	78	294	920	2095	3	590
n/o 8	16.3	75	168	532	1480	2	500
s/o 78	11.9	74	138	438	1290	2	515
n/o 78	16.3	76	206	655	1685	3	785
s/o 115	17.0	77	246	780	1890	4	910
n/o 115	14.3	76	182	576	1565	4	865
s/o Riv. Cty.	6.7	74	116	369	1130	3	530
SR-115							
n/o 8	3.5	72	81	257	810	5	535
s/o 78	3.7	72	77	243	765	2	205
n/o 78	3.4	75	155	490	1400	4	810
SR-186	4.4	68	*	104	330	3	180

*** indicates contour lies within the right-of-way.

All calculations assume flat hard terrain with no obstructions; actual conditions may reduce noise significantly.

2. Industrial Sources

Manufacturing and utility operations often emit noise which may impact sensitive receptors in the area of the plant. Existing major manufacturing sites within Imperial County are generally located away from concentrations of sensitive receptors. These include a gypsum plant in Plaster City, Holly Sugar and Calcot between Imperial and Brawley, and geothermal power plants in the southeast Salton Sea, Heber, and East Mesa areas. Additional geothermal plants are planned. Figure 1 includes the location of existing geothermal plants and areas where future plants may be located. More detailed descriptions of the geothermal plants may be found in the Geothermal and Transmission Element of the General Plan.

3. Agricultural Sources

The predominant land use in Imperial County is agriculture. Noise sources associated with agricultural operations include the field machinery, especially when diesel engine driven; heavy

trucks, used for the delivery of supplies and the distribution of products; and aircraft, used for the spraying of crops.

4. Other Sources

Noise sources not included above which are likely to be included in planning analyses include: construction noise; noise from commercial activities, such as automotive and truck repair, kennels, and entertainment facilities; noise from building heating, ventilating, and air conditioning (HVAC) systems; and noise from recreational areas, including off-road vehicles.

Noise from residential stereos, tools, parties and pets can be a source of noise complaints. This type of noise is not addressed in planning activities, but in ordinances specifically for controlling nuisance noise or generally for maintaining the peace.

C. Sensitive Receptors

Sensitive noise receptors are, in general, areas of habitation where the intrusion of noise has the potential to impact adversely the occupancy, use or enjoyment of the environment. Sensitive receptors include, but are not limited to, residences, schools, hospitals, parks and office buildings.

Sensitive receptors may also be non-human species. Many riparian bird species are sensitive to excessive noise.

III. GOALS AND OBJECTIVES

A. Preface

The Noise Element of the General Plan serves as the primary policy statement by the Board of Supervisors for implementing policies to maintain and improve the noise environment in Imperial County. This section of the Noise Element presents Imperial County's Goals and Objectives relative to planning for the noise environment within the unincorporated areas of the County. They have been prepared in collaboration with the General Plan Ad-Hoc Advisory Committee appointed by the Board of Supervisors.

The Goals and Objectives, together with the Implementation Programs and Policies in Chapter IV, are the statements that shall provide direction for private development and industry as well as government actions and programs. Imperial County's Goals and Objectives are intended to serve as long-term principles and policy statements representing ideals which have been determined by the citizens as being desirable and deserving of community time and resources to achieve. These Goals and Objectives, therefore, are important guidelines for decision making relative to proposed projects and land use planning. It is recognized, however, that other social, economic, environmental, and legal considerations are involved in decisions relative to environmental protection and that these Goals and Objectives, and those of the other General Plan Elements, should be used as guidelines but not doctrines.

B. Goals and Objectives

Noise Environment

Goal 1: Provide an acceptable noise environment for existing and future residents in Imperial County.

Objective 1.1 Adopt noise standards which protect sensitive noise receptors from adverse impact.

Objective 1.2 Ensure that noise standards and policies are compatible with the standards and policies of other General Plan Elements and other County agencies.

Objective 1.3 Control noise levels at the source where feasible.

Objective 1.4 Coordinate with airport operators to ensure operations are in conformance with approved Airport Land Use Plans.

Objective 1.5 Identify sensitive receptors with noise environments which are less than acceptable, and evaluate measures to improve the noise environment.

Objective 1.6 Collect data for existing noise sources in the County in order to improve the data base and enhance the ability to evaluate proposed projects and land uses.

Project/Land Use Planning

Goal 2: Review proposed projects for noise impacts and require design which will provide acceptable indoor and outdoor noise environments.

Objective 2.1 Adopt criteria delineating projects which should be analyzed for noise impact to sensitive receptors.

Objective 2.2 Provide acoustical analysis guidelines which minimize the burden on project proponents and project reviewers.

Objective 2.3 Work with project proponents to utilize site planning, architectural design, construction, and noise barriers to reduce noise impacts as projects are proposed.

Long Range Planning

Goal 3: Provide for environmental noise analysis inclusion in long range planning activities which affect the County.

Objective 3.1 Adopt procedures for the preparation of Specific Plans which include the requirement for a noise impact analysis.

Objective 3.2 Coordinate regularly with Caltrans to obtain information on trends and plans for roadway changes and improvements which would affect the noise environment.

C. Relationship to Other General Plan Elements

The Noise Element Policy Matrix (Table 5) identifies the relationship between the Noise Element Goals and Objectives to other Elements of the Imperial County General Plan. The Issue Area identifies the broader goals of the Element and the "Xs" identify that related objectives are contained in the corresponding Elements.

**TABLE 5
NOISE ELEMENT POLICY MATRIX**

Issue Area	Land Use	Housing	Circulation	Seismic/ Public Safety	Agricultural	Open Space Conservation	Geothermal	Water
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						on		
Noise Environment						X		
Land Use Planning	X		X					

IV. IMPLEMENTATION PROGRAMS AND POLICIES

A. Preface

The primary mechanism to implement the noise goals and objectives is to incorporate noise concerns into land use planning and the planning of noise-producing projects. Future noise/land use incompatibilities can be avoided or reduced by establishing criteria and standards for acceptable noise limits for various land uses throughout the County. It may not always be possible to avoid constructing noise sensitive developments in existing noisy areas. Therefore, this Element provides noise reduction strategies to be implemented in situations with potential noise/land use conflicts.

The first part of the implementation program identifies Noise Impact Zones for significant noise generators, where analysis of noise impacts must be performed. The standards to be applied in noise analyses and their evaluation are stated. Subsequent sections define programs for proposed projects, existing noise sources and noise reduction.

B. Noise Impact Zones

A Noise Impact Zone is an area that is likely to be exposed to significant noise. The County of Imperial defines a Noise Impact Zone as an area which may be exposed to noise greater than 60 dB CNEL or 75 dB $L_{eq}(1)$. The purpose of the Noise Impact Zone is to define areas and properties where an acoustical analysis of a proposed project is required to demonstrate project compliance with land use compatibility requirements and other applicable environmental noise standards. For purposes of this Element, any property meeting one of the following criteria is defined as being in a Noise Impact Zone:

- Within the noise impact zone distances to classified roadways, as indicated in Table 6.

TABLE 6 ROADWAY NOISE IMPACT ZONES	
Roadway Classification	Distance from Centerline - feet
Interstate	1,500
State Highway or Prime Arterial	1,100
Major Arterial	750
Secondary Arterial	450
Collector Street	150

- Within 750 feet of the centerline of any railroad.
- Within 1,000 feet of the boundary of any railroad switching yard.

- Within the existing or projected 60 dB CNEL contour of any airport, as shown in the Imperial County Airport Land Use Compatibility Plan or an approved airport master plan which supersedes the ALUCP. Note: Land use compatibility analysis, which may include an acoustical analysis, is required for projects proposed within the "airport vicinity" of each airport, as defined on the Compatibility Maps shown in the ALUCP. This may encompass a much larger area than the 60 dB CNEL contour.
- Within one-quarter mile (1,320 feet) of existing farmland which is in an agricultural zone.

C. Noise/Land Use Compatibility Standards

Land Use compatibility defines the acceptability of a land use in a specified noise environment. Table 7 provides the County of Imperial Noise/Land Use Compatibility Guidelines. When an acoustical analysis is performed, conformance of the proposed project with the Noise/Land Use Compatibility Guidelines will be used to evaluate potential noise impact and will provide criteria for environmental impact findings and conditions for project approval.

Table 8 provides the ALUCP Noise/Land Use Compatibility Criteria, which must be used to evaluate aircraft noise impacts. Noise standards associated with the construction and operation of geothermal power stations are included in Appendix B to the Geothermal and Transmission Element of the General Plan.

1. Interior Noise Standards

The California Noise Insulation Standards, California Code of Regulations Title 24, establishes a maximum interior noise level, with windows closed, of 45 dB CNEL, due to exterior sources. This requirement is applicable to new hotels, motels, apartment houses and dwellings other than detached single-family dwellings.

The County of Imperial hereby establishes the following additional interior noise standards to be considered in acoustical analyses.

- The interior noise standard for detached single family dwellings shall be 45 dB CNEL.
- The interior noise standard for schools, libraries, offices and other noise-sensitive areas where the occupancy is normally only in the day time, shall be 50 dB averaged over a one-hour period ($L_{eq}(1)$).

TABLE 7
NOISE/LAND USE COMPATIBILITY GUIDELINES

Land Use Category	Community Noise Exposure L_{da} or CNEL, dB					
	55	60	65	70	75	80
Residential	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Transient Lodging-Motels, Hotels	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Schools, Libraries, Churches, Hospitals, Nursing Homes	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Auditoriums, Concert Halls, Amphitheaters	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Sports Arena, Outdoor Spectator Sports	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Playgrounds, Neighborhood Parks	Normally Acceptable	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Golf Courses, Riding Stables, Water Recreation, Cemeteries	Normally Acceptable	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Office Buildings, Business Commercial and Professional	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Industrial, Manufacturing Utilities, Agriculture	Normally Acceptable	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable

Interpretation (For Land Use Planning Purposes)



Normally Acceptable

Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.



Conditionally Acceptable

New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.



Normally Unacceptable

New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.



Clearly Unacceptable

New construction or development clearly should not be undertaken.

TABLE 8
NOISE COMPATIBILITY CRITERIA

Land Use Category	CNEL, dBA				
	50-55	55-60	60-65	65-70	70-75
Residential					
single family, nursing homes, mobile homes	+	0	-	--	--
multi-family, apartments, condominiums	++	+	0	--	--
Public					
schools, libraries, hospitals	+	0	-	--	--
churches, auditoriums, concert halls	+	0	0	-	--
transportation, parking, cemeteries	++	++	++	+	0
Commercial and Industrial					
offices, retail trade	++	+	0	0	-
service commercial, wholesale trade, warehousing, light industrial	++	++	+	0	0
general manufacturing, utilities, extractive industry	++	++	++	+	+
Agricultural and Recreational					
cropland	++	++	++	++	+
livestock breeding	++	+	0	0	-
parks, playgrounds, zoos	++	+	+	0	-
golf courses, riding stables, water recreation	++	++	+	0	0
outdoor spectator sports	++	++	+	0	0
amphitheaters	+	0	-	--	--
<p>++ Clearly Acceptable The activities associated with the specified land use can be carried out with essentially no interference from the noise exposure.</p> <p>+ Normally Acceptable Noise is a factor to be considered in that slight interference with outdoor activities may occur. Conventional construction methods will eliminate most noise intrusions upon indoor activities.</p> <p>0 Marginally Acceptable The indicated noise exposure will cause moderate interference with outdoor activities and with indoor activities when windows are open. The land use is acceptable on the conditions that outdoor activities are minimal and construction features which provide sufficient noise attenuation are used (e.g., installation of air conditioning so that windows can be kept closed). Under other circumstances, the land use should be discouraged.</p> <p>- Normally Unacceptable Noise will create substantial interference with both outdoor and indoor activities. Noise intrusion upon indoor activities can be mitigated by requiring special noise insulation construction. Land uses which have conventionally constructed structures and/or involve outdoor activities which would be disrupted by noise should generally be avoided.</p> <p>-- Clearly Unacceptable Unacceptable noise intrusion upon land use activities will occur. Adequate structural noise</p>					

insulation is not practical under most circumstances. The indicated land use should be avoided unless strong overriding factors prevail and it should be prohibited if outdoor activities are involved.

2. Property Line Noise Standards

The Property Line Noise Limits listed in Table 9 shall apply to noise generation from one property to an adjacent property. The standards imply the existence of a sensitive receptor on the adjacent, or receiving, property. In the absence of a sensitive receptor, an exception or variance to the standards may be appropriate. These standards do not apply to construction noise.

These standards are intended to be enforced through the County's code enforcement program on the basis of complaints received from persons impacted by excessive noise. It must be acknowledged that a noise nuisance may occur even though an objective measurement with a sound level meter is not available. In such cases, the County may act to restrict disturbing, excessive, or offensive noise which causes discomfort or annoyance to reasonable persons of normal sensitivity residing in an area.

TABLE 9
PROPERTY LINE NOISE LIMITS

Zone	Time	Applicable Limit One-hour Average Sound Level (Decibels)
Residential Zones	7 a.m. to 10 p.m.	50
	10 p.m. to 7 a.m.	45
Multi-residential Zones	7 a.m. to 10 p.m.	55
	10 p.m. to 7 a.m.	50
Commercial Zones	7 a.m. to 10 p.m.	60
	10 p.m. to 7 a.m.	55
Light Industrial/Industrial Park Zones	Anytime	70
General Industrial Zones	Anytime	75
Note: When the noise-generating property and the receiving property have different uses, the more restrictive standard shall apply. When the ambient noise level is equal to or exceeds the Property Line noise standard, the increase of the existing or proposed noise shall not exceed 3 dB L_{eq} .		

3. Construction Noise Standards

Construction noise, from a single piece of equipment or a combination of equipment, shall not exceed 75 dB L_{eq} , when averaged over an eight (8) hour period, and measured at the nearest

sensitive receptor. This standard assumes a construction period, relative to an individual sensitive receptor of days or weeks. In cases of extended length construction times, the standard may be tightened so as not to exceed 75 dB L_{eq} when averaged over a one (1) hour period.

Construction equipment operation shall be limited to the hours of 7 a.m. to 7 p.m., Monday through Friday, and 9 a.m. to 5 p.m. Saturday. No commercial construction operations are permitted on Sunday or holidays. In cases of a person constructing or modifying a residence for himself/herself, and if the work is not being performed as a business, construction equipment operations may be performed on Sundays and holidays between the hours of 9 a.m. and 5 p.m.

Such non-commercial construction activities may be further restricted where disturbing, excessive, or offensive noise causes discomfort or annoyance to reasonable persons of normal sensitivity residing in an area.

4. Significant Increase of Ambient Noise Levels

The increase of noise levels generally results in an adverse impact to the noise environment. The Noise/Land Use Compatibility Guidelines are not intended to allow the increase of ambient noise levels up to the maximum without consideration of feasible noise reduction measures. The following guidelines are established by the County of Imperial for the evaluation of significant noise impact.

- a. If the future noise level after the project is completed will be within the "normally acceptable" noise levels shown in the Noise/Land Use Compatibility Guidelines, but will result in an increase of 5 dB CNEL or greater, the project will have a potentially significant noise impact and mitigation measures must be considered.
- b. If the future noise level after the project is completed will be greater than the "normally acceptable" noise levels shown in the Noise/Land Use Compatibility Guidelines, a noise increase of 3 dB CNEL or greater shall be considered a potentially significant noise impact and mitigation measures must be considered.

D. Programs and Policies

1. Acoustical Analysis of Proposed Projects

The County shall require the analysis of proposed discretionary projects which may generate excessive noise or which may be impacted by existing excessive noise levels, including but not limited to the following:

- An analysis shall be required for any project which would be located, all or in part, in a Noise Impact Zone as specified above.

- An analysis shall be required for any project which has the potential to generate noise in excess of the Property Line Noise Limits stated in Table 9.
- An analysis shall be required for any project which, although not located in a Noise Impact Zone, has the potential to result in a significant increase in noise levels to sensitive receptors in the community.

An acoustical analysis and report shall be prepared by a person deemed qualified by the Director of Planning. The report shall describe the existing noise environment, the proposed project, the projected noise impact and, if required, the proposed mitigation to ensure conformance with applicable standards.

2. Noise/Land Use Compatibility

Where acoustical analysis of a proposed project is required, the County shall identify and evaluate potential noise/land use conflicts that could result from the implementation of the project. Projects which result in noise levels that exceed the "Normally Acceptable" criteria of the Noise/Land Use Compatibility Guidelines, Table 7, shall include mitigation measures to eliminate or reduce to an acceptable level the adverse noise impacts.

3. Agricultural Noise/Right to Farm Ordinance

In recognition of the role of agriculture in the County, the Board of Supervisors has adopted a Right to Farm Ordinance (No. 1031). This ordinance requires a disclosure to owners and purchasers of property near agricultural lands or operations, or included in an area zoned for agricultural purposes. The disclosure advises persons that discomfort and inconvenience from machinery and aircraft noise resulting from conforming and accepted agricultural operations are a normal and necessary aspect of living in the agricultural areas of the County. The complete disclosure notice is contained in Appendix C.

If any residential or other noise sensitive land use is proposed within one-quarter mile (1,320 feet) of existing farmland which is in an agricultural zone, such proposed project shall be required to have prepared an acoustical analysis to evaluate potential noise impacts from farm operations on the proposed project. This may include an analysis of impact from operation of farm machinery or trucks hauling farm products on public roads.

4. Interior Noise Environment

Where an acoustical analysis of a proposed project is required, the County shall identify and evaluate projects to ensure compliance to the California (Title 24) interior noise standards and the additional requirements of this Element. Prior to the issuance of a building permit, an acoustical analysis, or equivalent documentation, must be submitted that demonstrates compliance with the

standard for all buildings to be located in an area of exterior noise level greater than 60 dB CNEL. No formal analysis may be required if the standard can be achieved by the minimum noise reduction indicated in Table 10 for the construction type proposed by the building permit or project.

TABLE 10
NOISE REDUCTION PROVIDED BY
COMMON BUILDING CONSTRUCTION METHODS

Construction Type	Typical Occupancy	General Description	Range ¹ of Noise Reduction, dB(A)
1	Residential, Commercial, Schools	Wood framing. Exterior stucco or wood sheathing. Interior drywall or plaster. Sliding glass windows. Windows partially open.	15 - 20
2	Residential, Commercial, Schools	Wood framing. Exterior stucco or wood sheathing. Interior drywall or plaster. Sliding glass windows. Windows partially closed.	25 - 30
3	Commercial, Schools	Wood framing. Exterior stucco or wood sheathing. Interior drywall or plaster. Sliding glass windows. Fixed 1/4 inch plate glass windows.	30 - 35
4	Commercial	Steel or concrete framing. Curtain wall or masonry exterior wall. Fixed 1/4 inch plate glass windows.	30 - 40
¹ The range depends upon the openness of the windows, the degree of seal and the window area involved.			

5. New Noise Generating Projects

The County shall identify and evaluate projects which have the potential to generate noise in excess of the Property Line Noise Limits specified in Table 9. An acoustical analysis must be submitted which demonstrates the project's compliance with the Property Line Noise Limits, and/or required mitigation measures to reduce noise to acceptable levels. Mitigation may include a greater property line setback than required by the Zoning Ordinance, use of solid building walls without openings, noise attenuation walls and/or landscaped earth berms, alternative construction materials or design, alternative traffic patterns, or other noise reduction techniques.

6. Projects Which Generate Off-Site Traffic Noise

The acoustical analysis shall identify and evaluate projects which will generate traffic and increase noise levels on off-site roadways. If the project has the potential to cause a significant noise impact to sensitive receptors along those roadways, the acoustical analysis report shall consider noise reduction measures to reduce the impact to a level less than significant, including reduction of the intensity of the proposed project, construction of noise attenuation walls and/or landscaped earth berms, or other changes in project design or its proposed access. For non-residential projects, reduced hours of operation may also be required.

7. Roadway Improvement and New Roadway Projects

The County shall evaluate the noise impact potential of proposed roadway projects. Where noise impacts to sensitive receptors exceed the criteria specified above under "Significant Increase of Ambient Noise Levels", mitigation measures shall be included, where feasible, to reduce the increase to an acceptable level. If the mitigation cannot be expected to conform to the criteria specified under "Significant Increase of Ambient Noise Levels" and exceed the "Noise/Land Use Compatibility Guidelines" specified in Table 7, the proposed roadway project shall not be approved unless a "Statement of Overriding Considerations" is made by the project approval authority pursuant to the *State CEQA Guidelines*, Section 15093.

Federally funded projects shall comply with the applicable Federal Highway Administration (FHWA) standards.

8. Mitigation of Noise Impacts

Where acoustical analysis indicates the potential for conflict with County noise standards or for significant noise impact, mitigation measures should be considered and incorporated into the project. Noise reduction measures may be applied at the source of the noise, along the path of the noise or at the receptor.

a. Noise Sources

Modification of noise sources may not be feasible for many projects, especially where the source is transportation noise. The reduction of vehicle noise is usually the responsibility of federal and state agencies. However, on each analysis, reduction of noise at the source should be considered.

If reduction at the source is possible, this is often the best solution for the noise environment.

In transportation applications, the location of the source, or the frequency of operation may be modified in certain situations. For example, the designation of a truck route may move a source of vehicle noise to a less sensitive area; the reconfiguration of airport takeoff and landing patterns may change the impacts of the noise source.

In non-transportation applications, reduction of noise at the source may be possible in single source applications by a change in the nature of the source or the specification of the source. Gasoline engines are quieter than diesel engines; mufflers are available for many types of equipment; pumps, motors, and many types of equipment may be specified for maximum noise ratings.

b. The Noise Path

Modification of the noise path is the most common method of noise reduction. Noise reduction measures may be applied near the source, in mid-path, or near the sensitive receptor(s). Path

modification may be effected by increasing the direct distance between the source and receptor or, more commonly, placing a barrier between the source and receiver. A noise barrier may be constructed solely for the purpose of noise reduction; a noise barrier may be comprised of other project elements. This latter type is discussed below in the sections related to site planning and architectural layout.

Noise Barriers. Noise barriers constructed exclusively for the purpose of noise reduction are most commonly used in connection with industrial noise sources and with ground transportation. The former case would include housings or buildings around pumps, motors, transformers and machinery. To reduce the impacts of ground transportation noise, walls or berms may be constructed along the rights-of-way of highways. Noise walls should be high enough to break the line of sight between the source and receptor; the wall should be long enough to prevent noise "flanking" around the end of the barrier; the wall should be thick enough to prevent significant noise transmission through the wall. To be effective, walls must be solid for the area of design. Even a small amount of opening will defeat the purpose of the wall.

The planning of a noise barrier must consider, in addition to acoustical requirements, aesthetics, safety and maintenance. Where a significant part of roadway noise comes from heavy trucks, as is the case in Imperial County, noise walls may have to be eight feet high to be effective, and visual impacts, as well as costs, may become paramount. Where feasible, earth berms may be used instead of walls, or a berm-wall combination. The advantages of earth berms are that a berm is more effective than a wall in noise reduction, and landscaping of a berm may improve aesthetics. The disadvantage of a berm is the additional ground area required. Where noise barriers are desired, and receptors do not want to lose a view, transparent walls, of glass or plastic, may be specified.

Site Planning. Consideration of noise impacts in site planning, using the shape and terrain of the site and the arrangement of project elements, can substantially reduce or eliminate adverse noise impacts. Site planning techniques for noise impact reduction include,

- Increasing the distance between the noise source and the sensitive receptor;
- Placing non-sensitive land uses, such as parking lots, open space, maintenance facilities and utility areas between the source and receptor;
- Using non-noise-sensitive structures, such as garages, to shield noise-sensitive areas;
- Orienting buildings to place the building as a shield between the source and the outdoor spaces of the building.

It should be noted that wide planted areas, such as parks or open space, provide greater noise attenuation than "hard" spaces, such as parking lots.

Architectural Layout. Noise reduction can be achieved by appropriate layout of the noise-sensitive spaces. For example, bedrooms will be quieter if placed on the side of the housing facing away from a roadway. U-shaped buildings can provide shielded, interior outdoor activity spaces. Noise-conscious architectural layout can often eliminate the need for costly construction modifications.

c. Noise Receptors

In most cases, the reduction of noise impact by some combination of source control and path modifications, as described above, is preferable to construction modifications at the receptor. In other cases, such as a single isolated receptor, construction modifications may be the most cost-effective solution to the noise problem. In general, the most effective modifications to reduce interior noise are made by reducing the area of windows, doors and other penetrations, such as ventilation intakes, exposed to the noise source and by making the windows, doors and other penetrations more resistant to noise transmission. Sealed windows, or well-sealing openable windows are efficient; mechanical ventilation must be provided for closed-windows conditions.

Thicker window glass or double glazing may be appropriate. Solid doors and gaskets around door openings should be provided. In addition to door and window treatment, wall and roof insulation may be evaluated for noise reduction effectiveness.

9. Noise Regulations

The provisions of this Element applicable to activities where no discretionary application is required pursuant to the County Zoning Ordinance or Subdivision Ordinance, or a Specific Plan or General Plan Amendment is not involved, shall be implemented by an appropriate amendment to the Imperial County Code of Regulatory Ordinances. This shall include measures relative to "Property Line Noise Standards" and "Construction Noise Standards" specified above; and may include enforcement provisions and appropriate penalties for non-compliance.

APPENDIX A

GLOSSARY OF TERMS

Acoustical Analysis Report: A report required when a proposed project may result in excessive noise or a violation of County noise standards. The report would provide analysis of existing and proposed noise conditions in the project area, and mitigation measures to be incorporated into the project to eliminate or reduce noise impacts.

Acoustics: The science and technology of sound, including its production, transmission and effects.

Ambient Noise: All-encompassing noise associated with a given environment, being usually being a composite of sounds from many sources, near and far. No particular sound is dominant.

A-weighted sound level: The sound level obtained by the use of A-weighting, which is the numerical correction of sound levels measured by a sound level meter to correspond to the sensitivity of the human ear to various frequencies of sound. The unit of measurement is the decibel (dB); often the symbol is written dB(A) to indicate that A-weighting has been used.

Community Noise Equivalent Level, CNEL: The 24-hour equivalent continuous sound level, i.e., the time-averaged A-weighted sound levels, in decibels, from midnight, obtained after the addition of 5 dB to sound levels from 7:00 p.m. to 10:00 p.m. and 10 dB to sound levels from midnight to 7:00 a.m. and from 10:00 p.m. to midnight.

Discretionary Project: A designation used in the California Environmental Quality Act (CEQA) to describe a project which requires the exercise of judgment or deliberation when the public agency or body decides to approve or disapprove a particular activity. A project which is not a discretionary project is a ministerial project. In Imperial County, discretionary approval is required for specific plans, tentative maps, and subdivisions.

Equivalent Continuous Sound Level, L_{eq} : The level of a steady sound which, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound.

Frequency: Of a periodic phenomenon, such as a sound wave; the number of times in one second that the phenomenon repeats itself. The unit of frequency is the hertz (hz), which corresponds to one cycle per second.

Ministerial Project: As defined in CEQA, a ministerial project describes a government decision involving little or no personal judgment by the public officials to the wisdom of carrying out the project. A ministerial decision involves the uses of fixed standards or objective measurements.

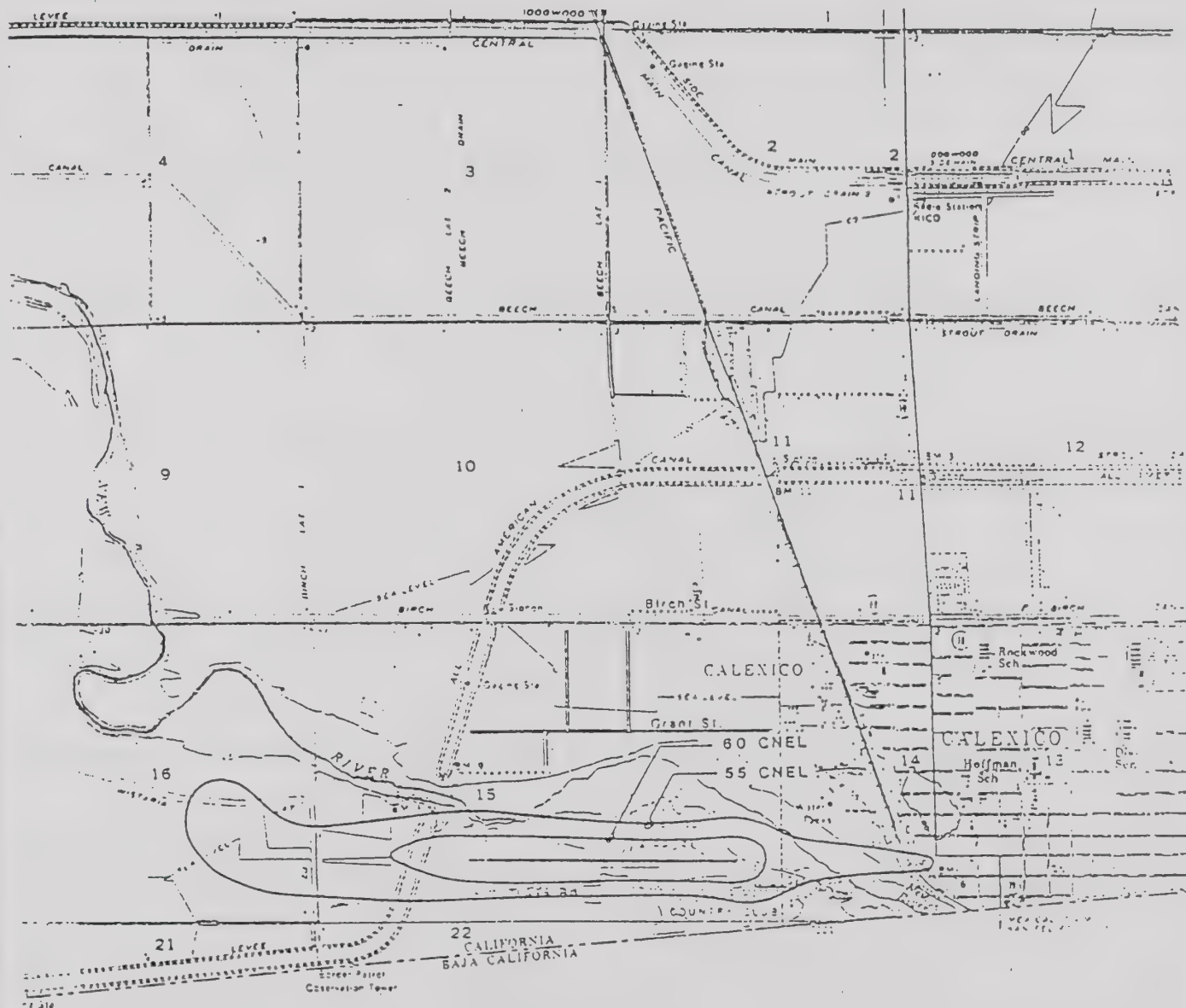
Examples of ministerial decisions are automobile registrations and marriage licenses. A building permit may be a ministerial decision if the ordinance requiring the permit limits the public official to determining if the zoning requirements have been met, the project meets the Uniform Building Code and the fees have been paid.

Noise: Unwanted sound.

Noise level: Sound level.

Sound: (1) An oscillation in pressure in an elastic medium which is capable of evoking the sensation of hearing. (2) The sensation of hearing excited by acoustic oscillation.

Sound level: The quantity, in decibels, measured by an instrument satisfying a standards requirement, e.g., the American National Standard Specification for Sound Level Meters S1.4. Mathematically, sound level in decibels is 20 times the logarithm to the base 10 of the ratio of a given sound pressure to the reference sound pressure of 20 micropascals.



SOURCE: June 91, Airport Land Use Compatibility Plan

0 1750' 3500'

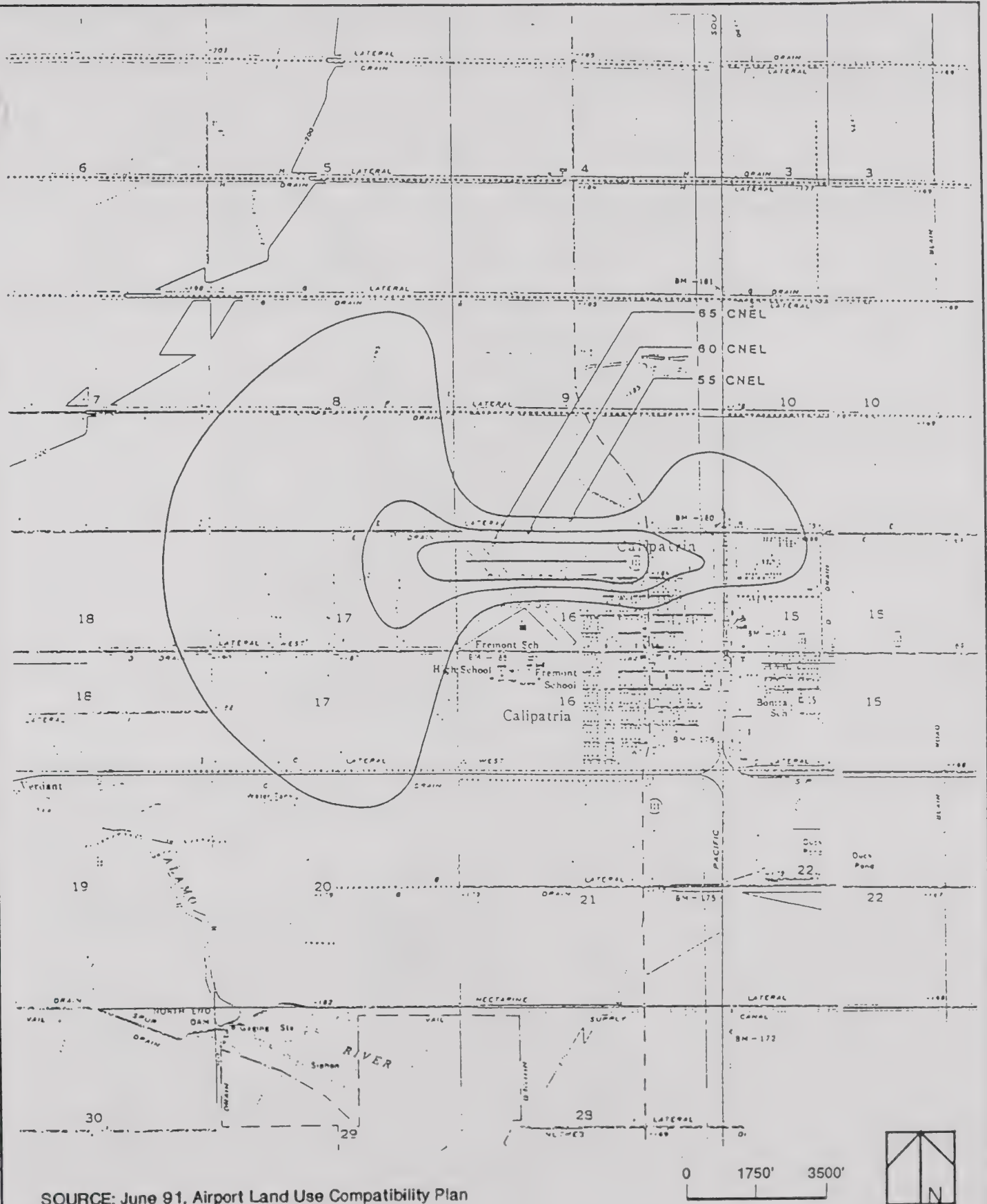


Imperial County
General Plan

Future Noise Impact Area
Calexico International Airport

Noise Element

Figure
B-2



Imperial County
General Plan

Future Noise Impact Area
Calipatria Municipal Airport

Noise Element

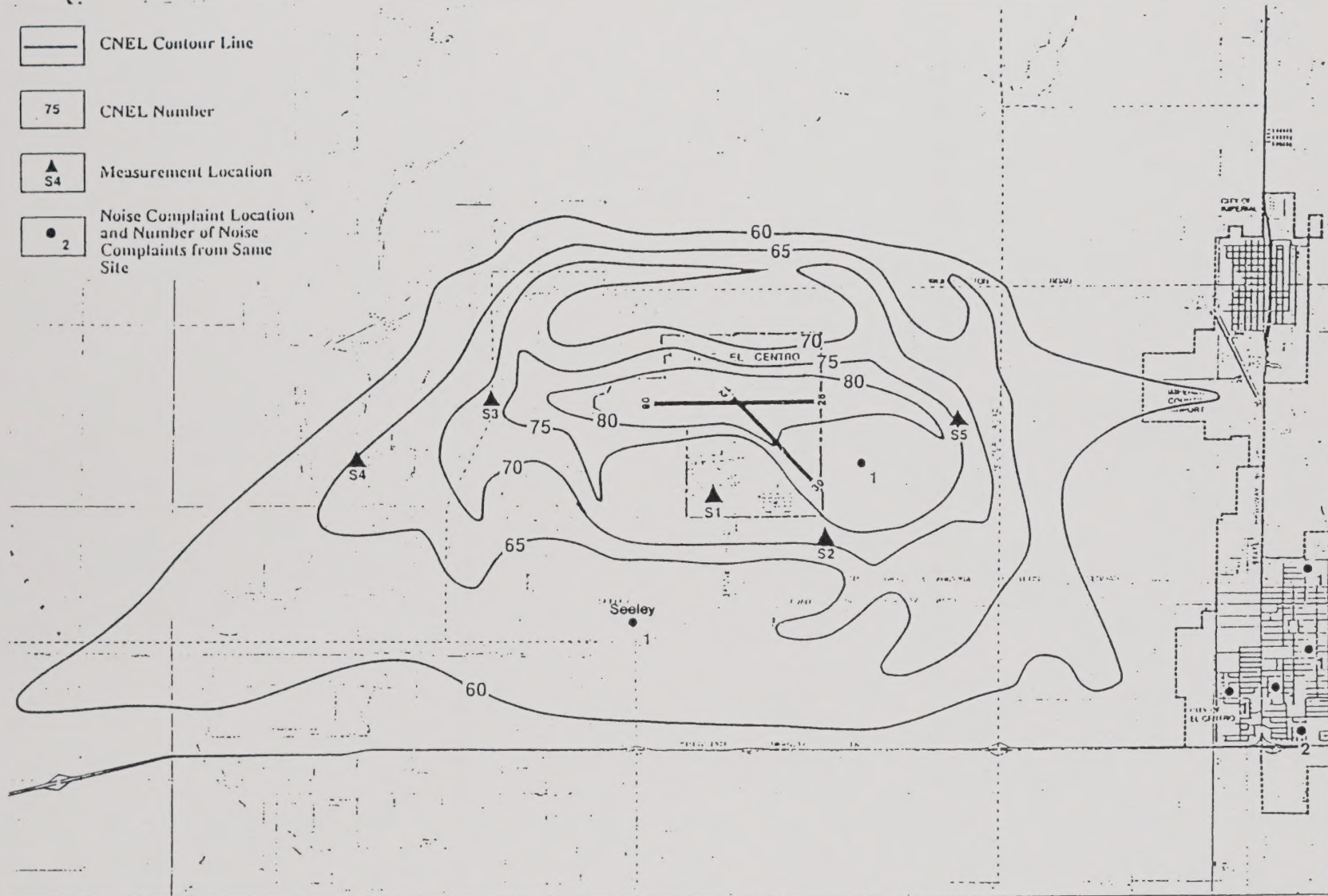
Figure
B-3

— CNEL Contour Line

75 CNEL Number

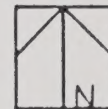
▲ S4 Measurement Location

● 2 Noise Complaint Location and Number of Noise Complaints from Same Site



SOURCE: June 91, Airport Land Use Compatibility Plan

0 1750' 3500'



Imperial County
General Plan

Future Noise Impact Area
NAF El Centro

Noise Element

Figure
B-5

Quaternary Basin
underlying Corral

Went to school
with my sister and
brother

B-4
1710



1710
1710
1710
1710

U.C. BERKELEY LIBRARIES



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